

AMENDMENTS TO THE CLAIMS

The following is a complete listing of the claims indicating the current status of each claim and including amendments currently entered as highlighted.

1-6. (canceled)

7. (currently amended) A method for iterative derivation of a master image from a plurality of sampled images of non-identical, at least partially overlapping, regions of a scene, the master image having an output resolution greater than a maximum resolution of the sampled images, the method comprising:

- (a) for each sampled image, defining:
 - (i) a transformation operator **F** mapping positions within the master image to corresponding positions in the sampled image,
 - (ii) a distortion operator **H** simulating a distortion associated with an imaging sensor from which the sampled image was generated, and
 - (iii) a sampling operator **D** for reducing an image from the output resolution to the resolution of the sampled image;
- (b) for each sampled image, applying said transformation operator, said distortion operator and said sampling operator to a current master image hypothesis so as to generate a predicted image, and calculating a difference image having pixel values corresponding to the difference in corresponding pixel values between the sampled image and the predicted image;

(c) performing back-projection of each of said difference images to generate a correction image for the current master image hypothesis; and

(d) employing said correction images to perform a correction to the current master image hypothesis to generate a new master image hypothesis,

wherein said back projection includes employing an operator \mathbf{H}^{bp} corresponding to a pseudo-inverse of distortion operator \mathbf{H} , wherein \mathbf{H}^{bp} approximates to an inverse of \mathbf{H} at spatial frequencies below a given value and approaches zero at spatial frequencies above said given value, and wherein \mathbf{H}^{bp} is chosen to substantially satisfy the condition:

$$\mathbf{H}^{bp} \times \mathbf{D}^t \times \mathbf{D} \times \mathbf{H} = \mathbf{I}$$

wherein:

I is the unit operator for an image of the output resolution;

D is a sampling operator for reducing an image from the output resolution to the resolution of an input image; and

D^t is an inflation operator for expanding an image from the resolution of the input image to the output resolution.

8. (canceled)

9. (original) The method of claim 7, wherein distortion operator \mathbf{H} corresponds to a combination of a modulation transfer function resulting from an optical system of the imaging sensor and a modulation transfer function resulting from a distortion generated by a sensor element array of the imaging sensor.

10. (original) The method of claim 7, wherein distortion operator **H** corresponds to a modulation transfer function describing only a first portion of a distortion generated by the imaging sensor, the method further comprising a post-processing step of deconvoluting a final master image hypothesis to substantially correct a modulation transfer function describing a remainder of a distortion generated by the imaging sensor.

11. (currently amended) A method for iterative derivation of a master image from a plurality of sampled images of non-identical, at least partially overlapping, regions of a scene, the master image having an output resolution greater than a maximum resolution of the sampled images, the method comprising: The method of claim 7,

- (a) for each sampled image, defining:
 - (i) a transformation operator **F** mapping positions within the master image to corresponding positions in the sampled image,
 - (ii) a distortion operator **H** simulating a distortion associated with an imaging sensor from which the sampled image was generated, and
 - (iii) a sampling operator **D** for reducing an image from the output resolution to the resolution of the sampled image;
- (b) for each sampled image, applying said transformation operator, said distortion operator and said sampling operator to a current master image hypothesis so as to generate a predicted image, and calculating a difference image having pixel values corresponding to the difference in

corresponding pixel values between the sampled image and the predicted image;

(c) performing back-projection of each of said difference images to generate a correction image for the current master image hypothesis; and

(d) employing said correction images to perform a correction to the current master image hypothesis to generate a new master image hypothesis,

wherein said back projection includes employing an operator \mathbf{H}^{bp} corresponding to a pseudo-inverse of distortion operator \mathbf{H} , wherein \mathbf{H}^{bp} approximates to an inverse of \mathbf{H} at spatial frequencies below a given value and approaches zero at spatial frequencies above said given value.

and wherein said correction to the current master image hypothesis includes combining the correction images by deriving a weighted average of values of corresponding pixels in said correction images, the weight of each pixel in each correction image being calculated as a function of a distance as measured in the sampled image between: (i) a point in the sampled image to which the pixel in the correction image is mapped by the transformation operator; and (ii) at least one pixel centroid proximal to said point.

12. (original) The method of claim 11, wherein said function of a distance is derived from distortion operator \mathbf{H} .

13-25. (canceled)